Biological Assessment for Impacts to
Federally Endangered and Threatened Species
Valero McKee Refinery Crude Expansion Project
Dallam, Sherman, Hartley,
and Moore Counties, Texas

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BIOLOGICAL ASSESSMENT FOR IMPACTS TO FEDERALLY ENDANGERED AND THREATENED SPECIES VALERO MCKEE REFINERY CRUDE EXPANSION PROJECT DALLAM, SHERMAN, HARTLEY, AND MOORE COUNTIES, TEXAS

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Acronyms and Abbreviations

AOU	American Ornithologist's Union
BA	Biological Assessment
CAA	Clean Air Act
CFR	*Code of Federal Regulations*
CH_4	methane
CO	carbon monoxide
DHDS	Diesel Hydrogen Desulfurization
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FCCU	Fluidized Catalytic Cracking Unit
Fed. Reg.	*Federal Register*
FWS	U.S. Fish and Wildlife Service
GHG	Greenhouse Gas
GIWW	Gulf Intracoastal Waterway
GOF	Gas Oil Fractionator
H_2S	hydrogen sulfide
HCU	Hydrocracking Unit
HDS	Hydrogen Desulfurization
IFR	Internal Floating Roof
LPCIWG	Lesser Prairie-Chicken Interstate Working Group
LPG	liquefied petroleum gas
LSR	Light straight run
mm	millimeters
MMBtu/hr	million British thermal units per hour
NAAQS	National Ambient Air Quality Standards
NMFS	National Marine Fisheries Service
NO_x	nitrogen oxides
NWR	National Wildlife Refuge
PDA	Propane Deasphalting Unit
PM_{10}	particulate matter smaller than 10 microns
$PM_{2.5}$	particulate matter smaller than 2.5 microns
PSD	Prevention of Significant Deterioration
PSI	pounds per square inch
RLE	Refinery Light Ends Unit
SIL	significant impact levels

SO_2	sulfur dioxide
SRU	Sulfur Recovery Unit
SWS	Sour Water Strippers
TGTU	tail gas treating units
TPWD	Texas Parks and Wildlife Department
$\mu g/m^3$	micrograms per cubic meter
USGS	U.S. Geological Survey
Valero	Valero Company
VTDC	Valero Distribution Center

1.0 INTRODUCTION

Diamond Shamrock Refining Company, L.P., a Valero Company (Valero), owns and operates a crude oil refinery located in Sunray, Texas (Appendix A, Figure 1). Crude oil is delivered to the Valero McKee Refinery via pipeline and trucks, then processed and refined into various petrochemical products and commercial petroleum products such as propane, gasoline, jet fuel, diesel fuel, and components of asphalt. Valero has requested an authorization to modify certain equipment at the Valero McKee Refinery, which will allow for an increase in the overall processing volume of crude oil, herein referred to as the Crude Expansion Project.

1.1 PURPOSE OF THE BIOLOGICAL ASSESSMENT

Valero's Crude Expansion Project's permitting process includes the U.S. Environmental Protection Agency's (EPA) review of the project's potential Greenhouse Gas (GHG) pollutants. EPA Region 6 is the current permitting authority for processing GHG permit applications in Texas. As a Federal permitting authority, when issuing a permit, the EPA must also consider a project's effects on federally listed species, as per Section 7 of the Endangered Species Act (ESA; U.S. Fish and Wildlife Service [FWS] and National Marine Fisheries Service [NMFS], 1998).

Section 7 of the ESA requires all Federal agencies to participate in the recovery and conservation of federally listed species, and that any activity funded, authorized, or carried out by a Federal agency does not jeopardize federally listed species (or destroy or modify designated critical habitat; FWS and NMFS, 1998). To facilitate Section 7 of the ESA, this Biological Assessment (BA) has been prepared for, and submitted to, the EPA for determination of the Crude Expansion Project's effects on federally listed species.

1.1.1 Determination of Action Area for Biological Assessment

To evaluate the Crude Expansion Project's potential effects on federally listed species, an area of potential project effects was established. This area of potential project effects is called an Action Area and is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 Code of Federal Regulations [CFR] 402.02; FWS and NMFS, 1998). The Action Area was determined by identifying the maximum area in which the proposed action may result in direct and indirect impacts to federally listed species.

The changes proposed to the refinery could cause both direct and indirect impacts depending on whether potential habitat for a federally listed species is present and whether the federally listed species is occupying the proposed construction area. Indirect impacts to surrounding areas may include noise, lighting, dust, erosion, stream sedimentation, and air emissions. For this BA, it was determined that air emissions from the proposed project have the potential to impact the largest area surrounding the refinery. Therefore, the boundaries of the Action Area were determined based on air dispersion modeling of project emissions.

The worst case Action Area was determined to extend up to 23.4 miles (37.6 kilometers) west-southwest from the refinery (Figure 2) based on the results of the modeling. The potential effects to federally listed species were evaluated within the determined Action Area. The following section provides additional information on how the Action Area was defined for purposes of this assessment.

1.1.1.1 Defining the Action Area

The Action Area was established using air dispersion modeling in such a manner as to ensure that any potential impact from emissions beyond the defined boundary of the Action Area would, by regulatory definitions, be de minimis or inconsequential. Accordingly, it would not be plausible that the project would have any effect on listed species or associated habitat beyond the Action Area, should any be present.

The boundary of the Action Area was conservatively delineated by applying EPA's significant impact levels (SILs). A SIL is established for each National Ambient Air Quality Standard (NAAQS), yet at a concentration significantly less than the corresponding NAAQS. By establishing such, EPA can ascertain when a potential impact is considered to be so low as to be inconsequential towards impinging on the total NAAQS.

The Clean Air Act (CAA) requires the EPA to set NAAQS for pollutants considered harmful to human health and the environment. The CAA established two types of NAAQS, Primary and Secondary standards. Primary standards set limits to protect public health, with an adequate margin of safety, where public health is defined to include the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare. Public welfare includes effects on soils, water, crops, wildlife, weather, economic values, and personal comfort and wellbeing. The EPA has set NAAQS for the following seven principal pollutants, also called criteria pollutants: nitrogen oxides (NO_X), carbon monoxide (CO), particulate matter smaller than 10 microns (PM_{10}), particulate matter smaller than 2.5 microns ($PM_{2.5}$), sulfur dioxide (SO_2), ozone, and lead (Pb).

Under the CAA, before a major modification of air pollution can begin construction in an area that is in compliance with or attaining the NAAQS (such as Moore County, the location of the refinery), it must obtain a permit under the Prevention of Significant Deterioration (PSD) program. In order to receive a PSD permit, the applicant must demonstrate that not only will it meet the NAAQS, but it will also comply with ambient air quality standards designed to prevent the deterioration of air quality (the PSD increments). An increment is a measure of how much of a pollutant can be added to the ambient air before air quality will significantly deteriorate. As part of the ambient air quality impacts analysis conducted during PSD permitting, sources use an air dispersion model to determine the potential impact the source will have on the surrounding air quality. To assess whether the potential impact is considerable, EPA has established the aforementioned SILs for each NAAQS. In addition to establishing when an impact is de minimis, the SILs are also used to determine when a proposed source's ambient impacts warrant a comprehensive (cumulative) source impacts analysis, the size of the impact area within which the air quality analysis is to be determined, and whether the increase in emissions from a proposed new source or modification is considered to cause or contribute to a modeled violation of any NAAQS.

As required, air dispersion modeling was conducted in support of the PSD permit application for the McKee Refinery Crude Expansion Project. In addition to determining whether or not the proposed project would cause or contribute to a violation of any NAAQS, the air dispersion modeling was used to define the Action Area for use in the evaluation of potential effects to threatened and endangered species.

The proposed net emission increases above the baseline conditions were modeled to determine whether the resulting off-property concentrations of criteria pollutants are greater than the SILs. Consistent with PSD modeling criteria, for pollutants with PSD-significant emissions (NO_X, CO, PM_{10}, $PM_{2.5}$, and SO_2), the difference between the proposed allowable emission rates associated with the Crude Expansion Project and current actual emission rates from the existing source were modeled.

Since the NAAQS are designed to protect public health and welfare, they along with the respective SILs, were utilized to define the Action Area. The results of the Action Area modeling analysis as well as the NAAQS standards and associated SILs are summarized in Table 1. These results are subject to change pending final approval of the permit by the Texas Commission on Environmental Quality. However, it is certain, that if the results were to change, the action area would only decrease compared to this worst case analysis. Also, it is important to note that the SILs are significantly less than the corresponding Primary and Secondary NAAQS and, as such, ensure a very conservative approach to defining the Action Area.

The SO_2 1-hour results establish a potential impact area that extends the greatest distance, 23.4 miles (37.6 kilometers), from the source. Therefore, the modeling results for this pollutant were conservatively utilized to define the Action Area, which corresponds to the area with predicted 1-hour SO_2 concentrations greater than the SIL. In the case of SO_2 1-hour, the SIL is 4 percent of the respective NAAQS, demonstrating that any impact outside of the Action Area is insignificant. The modeling receptors (red plus) with predicted concentrations greater than the SIL are illustrated in Figure 2. Any impact on air quality outside of the defined Action Area can be considered trivial and, therefore, the Biological Assessment does not evaluate impacts beyond the Action Area. Lastly, the Crude Expansion Project does not include any additional linear facilities that would occur beyond the Action Area; all potential project impacts are encompassed within the Action Area.

Table 1. Final Air Dispersion Modeling Results

Pollutant	Standard	Averaging Period	SIL ($\mu g/m^3$)	Action Area, Maximum Distance* (km)
NO_2	NAAQS	1-hour	7.5	0
		Annual	1	0
CO	NAAQS	1-hour	2000	0
		8-hour	500	0
PM_{10}	NAAQS	24-hour	5	0
$PM_{2.5}$	NAAQS	24-hour	1.2	4.1
		Annual	0.3	1.3
SO_2	NAAQS	1-hour	7.8	37.6
		3-hour	25	0
		24-hour	5	2.7
		Annual	1	1.5

*Distance where predicted concentrations become *de minimis* (less than the SIL).

1.2 REGIONAL PROJECT DESCRIPTION

The Valero McKee Refinery is located in northeastern Moore County, Texas, approximately 5 miles southwest of the town of Sunray (see Figure 1). The area surrounding the refinery and primarily consists of irrigated pastures or fields to the north of the refinery and range pasture, wind farms, and irrigated fields to the south. The Action Area encompasses Dallam, Sherman, Hartley, and Moore counties (see Figure 2); it is mostly made up of agricultural land (both rangeland and cropland), and includes the town of Dumas.

The Crude Expansion Project Area is located within the Kansan Biotic Province (Blair, 1950), and within the High Plains Ecological Region (McMahan et al. 1984; Omernick, 1987). The High Plains region contains both shortgrass and mixed grass prairie communities. Common grasses in the High Plains include little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), buffalograss (*Buchloe dactyloides*), various species of grama (*Bouteloua* spp.), three-awn (*Aristida* spp.), and broomweed (*Gutierrezia texana*). Although the High Plains is mostly flat and featureless, cacti, yucca, shrubs, and rocky outcroppings occur infrequently. The High Plains are considered semi-arid, receiving between 10–20 inches (250–510 millimeters [mm]) of precipitation annually (U.S. Geological Survey [USGS], 2010). Agriculture (cattle grazing, wheat, and cotton) is the primary economic activity in the region. South Palo Duro Creek, and ephemeral drainage, bisects the Crude Expansion Project Area from west to east.

1.3 TECHNICAL PROJECT DESCRIPTION

The Valero McKee Refinery processes crude oil to produce petrochemical products and commercial petroleum products. Crude oil is blended at a separate facility and transferred to the Valero McKee Refinery by pipelines and trucks. The crude oil is then processed and refined into various petrochemical products and commercial petroleum products such as propane, gasoline, jet fuel, diesel fuel, and asphalt (Valero, 2012).

The majority of crude processed at the refinery has typically been supplied from local gathering systems in the Texas Panhandle. Recent development of local gathering systems in the eastern Texas Panhandle, Oklahoma Panhandle, and southwestern Kansas has increased in an effort to supply more high quality local crude to the nearby refineries. Over the past year, these gathering system improvements have created an economic incentive for Valero to make certain modifications to the refinery in order to increase its overall crude oil processing capacity (Valero, 2012).

The proposed project is not a major expansion project involving the addition of new processing units, but rather it involves making several changes to existing process units to increase effectiveness of the refinery's existing crude processing (Valero, 2012). Ground disturbance is proposed for new tank construction and restructuring of dikes; however, most of the new construction and augmentations associated with the Crude Expansion Project will occur within the existing refinery footprint, which has already been extensively disturbed. The areas where new construction will occur are estimated to have ground-disturbing impacts of up to 10 feet below current ground surface.

The proposed Crude Expansion Project will debottleneck parts of the refinery to allow for additional crude processing. The proposed changes involve the installation and modification of equipment at several existing process units such as the Nos. 1 and 2 Crude Units, the Nos. 1 and 2 Vacuum Units, the Refinery Light Ends (RLE) Unit, the No. 4 Naphtha Fractionator, the Dehexanizer Tower (a Naphtha Fracitionator), the HCU, the Turbine Fuel Merox Unit, the Diesel Hydrotreater, the Gas Oil Fractionator (GOF), Sour Water Strippers (SWS), Amine Treating, and Sulfur Recovery Units (SRUs). In addition to changes at these process units, several new storage tanks will be added, a new boiler will be added, new pumps will be added to increase circulation at the existing cooling towers, and new piping will be added to accommodate the increased crude processing and account for certain operational constraints within the refinery.

The following sections provide technical detail of each modification and installation of equipment at the aforementioned existing processing units. The technical descriptions include identification of existing emission sources, new emission sources, and increased emission sources.

1.3.1 Nos. 1 and 2 Crude Units

The No. 1 and No. 2 Crude Units separate desalted crude oil into its primary boiling range products. This type of separation is accomplished by vaporizing the majority of the crude oil in a charge heater and fractionating it in a distillation tower. In the distillation tower, the vaporized portion of the feed rises and is separated into naphtha, turbine fuel, diesel, and gas oil products. Naphtha and light gasoline vapors from the top of the columns are condensed in air and water-cooled heat exchangers before further processing. Noncondensable vapors are processed in the RLE Unit and the heavy bottoms (referred to as “reduced crude”) are typically charged to the Vacuum Units. The refinery currently has the capability to bypass the Vacuum Units and process reduced crude at the refinery’s Fluidized Catalytic Cracking Unit (FCCU).

As part of this project, two new crude storage tanks will be added (EPNs: S-230 and S-231), the existing crude charge pumps will be replaced with larger pumps, existing gas oil/product pumps at No. 2 Crude Unit will be replaced, new fin fan product coolers will be installed, and new turbine fuel and diesel product fin fan coolers will be installed at the No. 1 Crude Unit. Piping replacements will be made, including the addition of bleeder valves. New crude desalter feed cross effluent exchangers will be added, new level gauges will be added, and pipes, filters, dehazers, and coalescers on the desalters will be modified to relieve hydraulic constraints on water supply. Valero also proposes to replace the existing reduced crude pipeline (which bypasses the Vacuum Units) with a larger pipeline and associated pumps to allow for an incremental increase in processing reduced crude at the FCCU. This incremental increase is going to be offset by shifting gas oil from the FCCU to the HCU. Therefore, there is no increase in throughput or emissions at the FCCU.

The following are the existing emission sources associated with the No. 1 and No. 2 Crude Units:

- No. 1 Crude Charge Heater (EPN: H-1)
- No. 2 Crude Charge Heater – Anderson (EPN: H-11)
- No. 2 Crude Charge Heater – Born (EPN: H-41)
- No. 2 Crude Charge Heater – Petrochem (EPN: H-9)
- No. 1 Crude Unit Fugitives (EPN: F-1CRUDE)
- No. 2 Crude Unit Fugitives (EPN: F-2CRUDE)

The process heaters will not require a physical change or an increase in their current permitted firing rates to accommodate the additional processing of crude at the No. 1 and No. 2 Crude Units. The permitted firing rates for these heaters as well as the other heaters in this application can be found in the individual PTE calculations of this application, and have been made enforceable through Attachment E of NSR Permit 9708. However, since the actual fuel firing rates for each process heater may increase with increased throughputs, they are considered affected sources. Only new fugitive emissions will be added according to the previously described changes.

1.3.2 Nos. 1 and No. 2 Vacuum Unit

The No. 1 Vacuum Unit processes reduced crude from the No. 1 Crude Unit and fractionates it into light and heavy gas oils and vacuum residual (pitch). The additional crude processing is projected to increase the Vacuum Crude Unit feed rates. The increased feed rate will result in actual firing rate increase at the No. 1 Vacuum Unit Charge Heater (EPN: H-2) but will not require an increase in its current represented firing rate. This heater will also be reconstructed due to its mechanical integrity. The convection and radiant tubes will be replaced with tubes coated to prevent corrosion. New fugitive emissions will be added with the new pump and associated ancillary piping at the No. 1 Vacuum Unit (EPN: F-1CRUDE).

Reduced crude from the No. 2 Crude Unit is largely fed to the No. 2 Vacuum Unit where a vacuum distillation column separates the reduced crude into two main fractions. These two main fractions include light and heavy gas oils and vacuum residual (pitch). The gas oils are transferred to the FCCU and Hydrocracking Unit (HCU) for cracking into lighter components and the pitch is transferred to the Propane Deasphalting Unit (PDA) to produce asphalt for sale.

The proposed Crude Expansion Project will increase the No. 2 Vacuum Unit feed rate. The following are the existing emission sources associated with the No. 2 Vacuum Unit:

- No. 2 Vacuum Charge Heater (EPN: H-26)
- No. 2 Vacuum Unit Fugitives (EPN: F-2CRUDE)

The increased feed rate will result in actual firing rate increase at the No. 2 Vacuum Unit Charge Heater (EPN: H-26), but will not require an increase in its current represented firing rate. New fugitive emissions will be added with the new ejector and associated ancillary piping, pumps and equipment at the No. 2 Vacuum Unit.

1.3.3 Gas Oil Fractionator

The GOF is used as a swing unit in processing crude, gas oil, or diesel. The GOF separates the feed material into fractions depending on the feed material. Purchased gas oil, a mixture of gas oil and diluent, produces finished gas oil and naphtha/light straight run (LSR). Crude oil is fractionated into a LSR-diesel fraction and gas oil and heavier products.

In each operating scenario, the feed material is heated by exchange, desalted and then passed through the GOF Charge Heater (EPN: H-13), where it is heated and the lighter materials are vaporized. With the planned increase in crude processing, the production rates for the GOF are expected to increase. The tower trays will be modified, new or modified pumps will be added/ changed to increase the pumping rate, and new exchangers will be added (F-HDS GOF). The increased feed rate will result in a firing rate increase at the GOF Charge Heater, but will not require an increase in its current permitting represented firing rate. A steam reboiler may be included to accommodate the increase in throughput at the GOF.

1.3.4 Refinery Light Ends Unit

Gaseous overheads from the No. 1 and No. 2 Crude Units are transferred to the RLE Unit where hydrogen sulfide (H_2S), water, and mercaptans are removed from the overheads. The RLE Unit also receives liquefied petroleum gas (LPG) streams from the refinery debutanizers, HCU, and the Naphtha Reformers and distills the liquid to produce light ends gas, which is used as refinery fuel gas. The RLE Unit also produces propane, n-butane and iso-butane as final products for sale. Some of the iso-butane is transferred to the Alkylation Unit for further processing.

With increased crude processing at the No. 1 and No. 2 Crude Units, additional overhead gases from the crude towers and LPG from the debutanizers will require more processing at the RLE Unit. Valero proposes to modify the RLE Unit to accommodate this additional processing by installing a new higher pressure De-Ethanizer, cooling water exchangers for overhead cooling, and a steam reboiler. The inlet to the new De-Ethanizer will have a caustic treater, amine treater, and a sand tank. Other changes include adding a new pump to move liquid feed to the new De-Ethanizer, and adding a new charge pump on the Low Temp Depropanizer Charge Drum, and other minor piping changes may also be required.

There are no existing combustion emission sources associated with the RLE Unit. Only new fugitives emissions will be added to the RLE Unit in accordance with the described changes (EPN: F-RLE).

1.3.5 Naphtha Fractionators

LSR naphtha from the Crude Units is fed to the Naphtha Fractionators. Using heat supplied by the Naphtha Reboilers, the Naphtha Fractionators separate the LSR naphtha into heavier naphtha, unstable LSR, and gaseous overheads. The overheads are fed to the RLE Unit for further processing as described above, while the heavier naphtha is transferred to the refinery Hydrotreaters to remove sulfur.

As part of the proposed project, new overhead fans will be installed on the No. 4 Naphtha Fractionator, parallel to the existing fans that currently cool the gaseous overheads sent to the RLE unit. Other changes to the naphtha fractionators include adding a new reboiler to the Dehexanizer (which actually operates as a naphtha fractionator). The reboiler return nozzle on the Dehexanizer will be raised and some trays will be removed to allow for more circulation through the reboiler.

The No. 4 Naphtha Hydrotreater Charge Heater (EPN: H-64) will be equipped with new burners in this project. The current burners are undersized and the new burners will allow the heater to be fired up to its current permit represented firing rate. Furthermore, to account for the incremental increase in naphtha produced from increased crude processing at the Crude Units, new piping, pumps and control instrumentation will be installed to transfer the additional naphtha to the existing FCC Gasoline Hydrogen Desulfurization (HDS) Unit. The FCC Gasoline HDS Unit currently hydrotreats gasoline produced from the FCCU, similar to the Naphtha Hydrotreaters, and currently has the capacity to process the increased naphtha without modifications. New fugitives emissions will be added in accordance with the described changes (EPN: F-4HT, F-1CRUDE, and F-GHDS respectively).

1.3.6 Hydrocracking Unit

The HCU uses hydrogen to sweeten and crack gas oil over a fixed bed of catalyst. Product composition can vary depending on operating parameters, feedstock composition, and catalyst type; however, primary products include LPG, LSR, naphtha, turbine fuel, and diesel. Makeup hydrogen from the Reformers is compressed, heated in the Recycle Heater H-42, and used as a reactant in the HCU. Desulfurization, denitrogenation, hydrogenation and cracking occur primarily in the first reactor and cracking and final hydrotreating in the second reactor. Subsequently, a high pressure and low pressure separator are used to remove and recycle hydrogen, remove light gases sent to the RLE Unit, and separate liquids sent to a debutanizer. Liquid from the low pressure separator is charged to the debutanizer. A process heater (EPN: H-43) provides heat to reboil the debutanizer. Debutanizer overhead gas and liquid are sweetened in the RLE Unit. Debutanizer bottoms liquid is heated in the HCU Fractionator Charge Heater (EPN: H-8) and charged to the HCU fractionator. Overhead gas from the fractionator is treated in the RLE Unit, and sour water is charged to the sour water strippers. Sweet products from the fractionator include LSR, naphtha, turbine fuel, distillate, and gas oil. The products are stored in tanks or sent to other units for further processing.

The Crude Expansion Project will increase the amount of gas oil processed at the HCU; therefore, the associated process heaters are expected to increase actual firing. These sources are considered affected emission sources. The increased capacity will require a new charge tank (EPN: S-234). New feed filters will be added, and the fractionator's internals will be modified. Minor piping and ancillary equipment changes/addition will be made to accommodate the increase in feed rate to the unit associated with the increased crude processing (EPN F-HCU).

1.3.7 Turbine Fuel Merox Unit

Turbine fuel produced from the Crude Units is treated to remove sulfur using the Turbine Fuel Merox Unit. The Turbine Fuel Merox Unit sweetens turbine fuel by converting mercaptan sulfur compounds to disulfide sulfur compounds. In the Merox process, hydrocarbon is mixed with air and passed over a Merox catalyst. In the presence of air, the Merox catalyst reacts with mercaptan sulfur in the hydrocarbon to form disulfides and water. The Merox catalyst requires periodic saturation with caustic to remain active, so caustic is occasionally circulated over the catalyst to maintain activity. There are no existing combustion emission sources associated with this unit. Minor piping and ancillary equipment changes/addition will be made to accommodate the increase in feed rate to the unit associated with the increased crude processing.

1.3.8 Diesel Hydrotreater

Diesel produced from the Crude Units is treated to remove sulfur using the Diesel Hydrotreater. The Diesel Hydrotreater uses hydrogen to sweeten diesel by converting sulfur compounds to hydrogen sulfide over a catalyst. Prior to reacting with hydrogen, the sour diesel is heated using the Diesel Hydrogen Desulfurization (DHDS) Unit Charge Heater (EPN: H-48). Minor piping and ancillary equipment changes/addition will be made to accommodate the increase in feed rate to the unit associated with the increased crude processing.

1.3.9 Amine Treating, Sour Stripping and Sulfur Recovery Plants

The Valero McKee Refinery's Crude Expansion Project will include modifications to the amine treating system, No. 1 SRU, and No. 2 SRU. The No. 1 SRU production capacity will be expanded up to 50 LTPD. The No. 2 SRU will not increase production above the current capacity of 60 LTPD. Though not required to accommodate the increase in crude processing, Valero proposes, as part of this project, to modify the SRUs such to integrate the SRUs at each key processing stage (i.e., interchange acid gas feeds, reactor products, and a tail gas treatment streams). These changes will allow for more operational flexibility and better reliability. Similarly, additional changes will be made at the refinery's fuel gas amine treating system such as a new filtration system, new/spare rich amine flash drum, new spare amine overhead system, etc. which will improve operational reliability.

Amine treating is used to separate light organic gases (fuel gas) from the acid gas streams generated at the refinery hydrotreating process units. The No. 1 and No. 2 SRUs are used to extract elemental sulfur from treated acid gas streams. The SRUs consist of a straight-through Claus process. Amine acid gas, sour water stripper gas, and recycle acid gas from the tail gas unit are charged to the reactor furnace. A blower provides air to burn approximately one third of the H_2S to SO_2. The reactor products are cooled and passed through a sulfur condenser. The remaining vapors are heated and passed through a separate catalytic reactor which produces additional elemental sulfur.

The tail gas from the Claus process is directed to tail gas treating units (TGTU) consisting of a treating unit and incinerator. The treating units are designed to reduce the sulfur in the tail gas to H_2S. The H_2S is then absorbed and stripped before being sent back to the Claus units for further sulfur recovery. The remaining gases are incinerated, and vented out to the atmosphere (EPNs: V-5 and V-16, respectively).

The existing Amine Treating System is capable to handle additional acid gas due to the recent installation of the Flare Gas Recovery Unit. Sour water stripping is expected to increase; therefore, new fugitive components associated with handling sour water and a new sour water surge tank (EPN: S-233) will be added, and modification to the SRUs will be made to accommodate the additional processing of acid gas, sour water and ammonia.

1.3.10 New Components

1.3.10.1 Crude and Product Storage

The Crude Expansion Project will result in an increase in throughput and production of many intermediate and final products at the refinery, including but not limited to the following: naphtha, LSR, gasoline, turbine fuel, jet fuel, diesel, gas oil, vacuum resid, slop oils, sour water, reformate, alkylate, LPG, propanes, and butanes.

The Crude Expansion project will require the addition of new Internal Floating Roof (IFR) storage tanks for crude (EPNs: S-230, S-231), gasoline (EPN: S-232), HCU charge (EPN: S-234), LSR (EPN: S-235) and Naphtha (EPNs: S-236, S-237), sour water (EPN: S-233), and a propane/propylene product pressure tank.

Several existing storage tanks will require an increase in the past represented throughput rates to accommodate the increased throughputs and are considered modified. Modifications for crude storage will also entail adding new fugitive components such as new crude tank metering, drain systems, and solid separation to the tank farms (EPNs: F-NTNKFRM, F-WTNKFRM, F-ETNKFRM).

Existing LPG, propanes, and butanes are stored in pressurized tanks and do not emit under normal circumstances. A new pressurized tank for propane/propylene will be added; however, it will also not emit during normal circumstances. Therefore, these storage tanks are not considered affected sources. CH_4 can be expected to be emitted from crude oil storage tanks, but not from the products tanks, sour water tank, and LPG, propanes, and butanes tanks. Therefore, only crude oil storage tanks are considered new and affected GHG storage tanks.

1.3.10.2 Steam Production

Process equipment utilizes steam produced by existing boilers and steam produced by heat recovery from certain refinery processes. Based on review of the proposed process changes and steam balance information, Valero has concluded that the proposed project will result in an incremental increase of steam usage equivalent to approximately 60 MMBtu/hr (annual average) of 300 psi or 150 psi steam from the existing boilers. Therefore, the existing boilers are considered upstream affected emission sources. For operational reliability purposes, a new 225 MMBtu/hr steam boiler (EPN: B-22) will also be added to ensure sufficient steam is provided throughout the refinery in the case one existing boiler is down for maintenance.

1.3.10.3 Cooling Towers

Refinery process equipment utilizes water for a variety of heat exchange processes from three cooling tower (EPNs: F-20, F-21 and F-47). More pumps will be added to the existing cooling towers to meet the project's circulation demand. However, no GHG emissions are expected from the cooling towers. Therefore, the cooling towers are not considered GHG affected units.

1.3.11 Additional Improvements

In addition to the improvements described above, a rail loading area (the Valero Distribution Center [VTDC]), has been defined as part of this project; however, no construction is anticipated in this area. The McKee Refinery transfers most refinery products via trucks, railcars, and pipeline for off-site sales. With increased production of motor fuels, turbine fuel, and diesel associated with this project, product loading is expected to increase and is therefore affected. However, the increase will not require any new loading racks or an increase in the current permitted loading rates for the existing loading racks, other than the truck loading rack (EPN: L-11) and the diesel railcar loading racks (EPNs: L-5 and L-13). Given this fact and since product loading is more driven by local economics rather than increased production, all loading operations other than the truck loading rack and the diesel railcar loading racks are not considered affected sources of the Crude Expansion Project. The truck loading rack (EPN: L-11) and the diesel railcar loading rack (EPN: L-13) are controlled by a vapor combustor; therefore, the truck rack (EPN: L-11) and the diesel railcar loading rack (EPN: L-13) are considered affected.

2.0 STATUS OF THE LISTED SPECIES

Five species are federally listed as endangered or threatened and potentially occur within Dallam, Sherman, Hartley, or Moore counties, including the whooping crane, interior least tern, gray wolf, black-footed ferret, and Arkansas River shiner (Table 2; interior least tern and Arkansas River shiner are only listed as potentially occurring within Moore County). A sixth species, the lesser prairie-chicken, is a candidate for listing under the ESA, and is included in the analysis despite not actually being designated as federally endangered or threatened at present. Candidate species are not afforded any protection under the ESA. It should be noted that the current politics and science surrounding the lesser prairie-chicken indicates that it could be listed in the near future due to continuously precipitous population declines (see 76 Fed. Reg. 66393). Since there exists a possibility of the lesser prairie-chicken becoming a federally listed species during the Crude Expansion Project's GHG permitting process, it is included within this BA. Significant literature sources consulted for this report include the FWS status reports and recovery plans, Texas Parks and Wildlife Department (TPWD) technical reports, peer-reviewed journals, and other standard references, including the FWS website for listed species by county.

Table 2
Federally Endangered and Threatened Species of Potential Occurrence in Dallam, Sherman, Hartley, and Moore Counties, Texas[1]

Common Name[2]	Scientific Name[2]	Listing Status[3]
BIRDS		
Whooping crane[3]	*Grus Americana*	E
Least tern (interior subspecies)[3]	*Sternula antillarum athalassos*[4]	E
Lesser prairie-chicken	*Tympanuchus pallidicinctus*	C
MAMMALS		
Black-footed ferret	*Mustela nigripes*	E
Gray wolf	*Canis lupus*	E
FISH		
Arkansas River shiner	*Notropis girardi*	T

[1]According to FWS (2013) or Texas Parks and Wildlife (TPWD) 2013.
[2]Nomenclature follows American Ornithologist's Union (AOU, 1998, 2000, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012) and FWS (2013).
[3]Migratory species of potential occurrence.
[4]The least tern has been reclassified from *Sterna* to *Sternula* (AOU, 2006).

2.1 WHOOPING CRANE

2.1.1 Reasons for Status

The whooping crane (*Grus americana*) was federally listed as endangered on March 11, 1967 (32 *Federal Register* [Fed. Reg.] 4001). Critical habitat has been designated in Aransas, Calhoun, and Refugio counties in Texas and includes the Aransas National Wildlife Refuge (NWR). Three introduced flocks are listed as experimental nonessential populations and include nonmigrating Florida and Louisiana populations, and another that migrates between Wisconsin and Florida. The main factors for the decline of the whooping crane were loss of habitat to agriculture, human disturbance of nesting areas, uncontrolled hunting, and collisions with power lines (FWS, 2012). Biological factors, such as delayed sexual maturity and small clutch size, prevent rapid population recovery. Drought during the breeding season presents serious hazards to this species (Campbell, 1995). Whooping cranes are vulnerable to loss of habitat along their long migration route (FWS, 2012), along which they are still subject to cataclysmic weather events, accidental shooting, collision with power lines, and predators. They are susceptible to avian tuberculosis, avian cholera, and lead poisoning (Campbell, 1995). Exposure to disease is a special problem when large numbers of birds are concentrated in limited areas, as often happens during times of drought.

While in Texas, the main population is at risk from chemical spills along the Gulf Intracoastal Waterway (GIWW), which passes through the center of their winter range (Campbell, 1995). The presence of contaminants in the food base is another potential problem on their wintering grounds (Oberholser, 1974), and a late-season hurricane or other weather event could be disastrous to this concentrated population.

2.1.2 Habitat

Nesting habitat in Canada is freshwater marshes and wet prairies (FWS, 2012), interspersed with numerous potholes and narrow-wooded ridges. Whooping cranes use a variety of habitats during migration (Campbell, 1995). They feed on grain in croplands (Lewis, 1995), and large wetland areas are used for feeding and roosting. Riverine habitats, such as submerged sandbars, are often used for roosting. The principal winter habitat in Texas is brackish bays, marshes, and salt flats, although whooping cranes sometimes feed in upland sites characterized by oak mottes, grassland swales, and ponds on gently rolling sandy soils (Campbell, 1995).

Summer foods include large insect nymphs or larvae, frogs, rodents, small birds, minnows, and berries. During the winter in Texas they eat a wide variety of plant and animal foods. Blue crabs, clams, and fruit of Carolina wolfberry (*Lycium carolinianum*) constitute the diet. Foods taken at upland sites include acorns, snails, crayfish, and insects (Campbell, 1995).

2.1.3 Range

Whooping cranes were originally found throughout most of North America. In the nineteenth century, the main breeding area was from the Northwest Territories to the prairie provinces in Canada, and the northern prairie states to Illinois. A nonmigratory flock existed in Louisiana but is now extirpated. Whooping cranes wintered from Florida to New Jersey along the Atlantic Coast, along the Texas Gulf Coast, and in the high plateaus of central Mexico. They now breed in isolated, marshy areas of Wood Buffalo National Park, Northwest Territories, Canada. They winter primarily in the Aransas NWR and adjacent areas of the central Texas Gulf Coast (FWS, 1995). During migration they use various stopover areas in western Canada and the American Midwest.

Three experimental flocks have been established by incubating eggs and rearing the young in captivity before releasing them into the wild. In 1999, a new migratory flock was established in which chicks are conditioned to follow an ultralight aircraft from the Necedah National Wildlife Refuge in central Wisconsin to coastal Florida (International Crane Foundation, 2012). Introduction of a nonmigratory flock to Kissimmee Prairie in Florida began in 1993 (FWS, 2012), and an additional nonmigratory flock was introduced to Louisiana's White Lake Wetlands Conservation Area in 2011 (FWS, 2011a).

2.1.4 Distribution in Texas

The natural wild population of whooping cranes spends its winters at the Aransas NWR, Matagorda Island, Isla San Jose, portions of the Lamar Peninsula, and Welder Point on the east side of San Antonio Bay (FWS, 2012).

2.1.5 Presence in the Action Area

Only one wild population of whooping cranes exists, which is the Aransas/Wood Buffalo population, breeds in Wood Buffalo National Park in northern Canada, and migrates annually to the Aransas NWR and adjacent areas of the central Texas coast in Aransas, Calhoun, and Refugio counties where it winters (Lewis, 1995; FWS, 1995). During migration, whooping cranes stop over at wetlands and pastures to roost and feed. TPWD (2013) includes the species on their list of species potentially occurring in Dallam, Sherman, Hartley, and Moore counties; however, the Action Area is west and beyond the regular migration corridor of this species (Lockwood and Freeman, 2004), and thus whooping cranes are not expected to occur in the Action Area, except as a rare and transient migrant.

2.2 LEAST TERN (INTERIOR SUBSPECIES)

2.2.1 Reasons for Status

The interior least tern (*Sternula* [formerly *Sterna*] *antillarum athalassos*) was federally listed as endangered on May 28, 1985 (50 Fed. Reg. 21784–21792), without critical habitat. The main factors for the decline of the interior least tern were loss of habitat, decimated by extensive water management projects and increased use of beaches and sandbars (Thompson et al., 1997). Many nesting islands in rivers have been permanently destroyed or inundated by reservoirs and channelization projects, and unfavorable vegetational succession from the altercation of natural river dynamics on many remaining islands are all factors (FWS, 1985). Annual spring floods of these watersheds are often delayed past the onset of normal breeding, and the islands are not exposed in time to be suitable nest sites (FWS, 1985).

2.2.2 Habitat

The interior least tern's preferred nesting habitat is unvegetated, frequently flooded sand flats, salt flats, sand and gravel bars, and sand, shell, and/or gravel beaches (Campbell, 1995; Thompson et al., 1997). Foods include tiny fish and shrimp which are taken in the typical hover-plunge manner of terns, but the least tern occasionally skims the water to forage on surface-dwelling organisms (Oberholser, 1974).

2.2.3 Range

The interior least tern historically bred along the Colorado (in Texas), Red, Rio Grande, Arkansas, Missouri, Ohio, and Mississippi rivers systems from Montana southward through South Dakota, Nebraska, eastern Colorado, Iowa, Kansas, Missouri, Illinois, Indiana, and Kentucky to eastern New Mexico, Oklahoma, Arkansas, Tennessee, central Texas, central Louisiana, and central Mississippi (Thompson et al., 1997). The current breeding distribution is a remnant of the former range in the interior of the U.S., with Indiana listing the interior least tern as extirpated (FWS, 1985).

2.2.4 Distribution in Texas

The interior least tern historically nested on sandbars of the Colorado River, Red River, and Rio Grande. At present time, only small breeding populations exist at isolated locations within the species historic range, although its wintering range includes the entire Texas Gulf Coast.

2.2.5 Presence in the Action Area

TPWD (2013) includes the species on their list of species potentially occurring in Moore County. The least tern (interior subspecies) is a potential migrant through the Action Area and is known to nest in the region; potential nesting locations for interior least terns occur about 22 miles south on the Canadian River and Lake Meredith. These areas of potential habitat are beyond the Action Area and the Crude Expansion Project is likely to have no effect on interior least terns or their potential habitats.

2.3 LESSER PRAIRIE-CHICKEN

2.3.1 Reasons for Status

The lesser prairie-chicken (*Tympanuchus pallidicinctus*) was federally listed as a candidate species on June 9, 1998 (63 Fed. Reg. 31400–31406), with critical habitat being proposed concurrently with the proposed listing if found to be prudent and determinable (FWS, 2011b). The main factors for the decline of the lesser prairie-chicken are loss of habitat from conversion of native rangelands to introduced forages and cultivation, habitat modification, and degradation caused by grazing, woody plant invasion, fire suppression, herbicides, and habitat fragmentation (FWS, 2007).

2.3.2 Habitat

The lesser prairie-chicken inhabits semiarid rangelands dominated primarily by Harvard shin oak (*Quercus havardii*) or sand sagebrush (*Artemisia filifolia*), with often some bunch grass, such as little bluestem (*Schizachyrium scoparium*) being present. The lesser prairie-chicken's diet, which is dependent on the season, includes acorns in the fall and winter, and buds and fruits of the sumac, legumes, and other plants in the spring and summer. When available, wheat, sorghum, and other grains, as well as insects are consumed (Oberholser, 1974).

2.3.3 Range

This species has one of the smallest population sizes and most restricted distributions of North American grouse and currently occurs in five states within the southern Great Plains, including southeastern Colorado, southwestern Kansas, the Panhandle, and northwestern counties of Oklahoma, southeastern New Mexico, and the northeastern and southwestern portions of the Texas Panhandle (Hagan, 2005).

2.3.4 Distribution in Texas

This species currently occurs in two disjunct populations in the Panhandle (Lockwood and Freeman, 2004). The population on the western edge of the Panhandle extends from Deaf Smith County southward to Gaines and possibly Andrews counties, while the eastern population ranges from Lipscomb County south to Collingsworth County (Lockwood and Freeman, 2004). Human activities (i.e., excessive grazing of rangelands by livestock and conversion of native rangelands to cropland) and recurrent droughts have significantly reduced the population and the distribution of the species since the early 1900s.

2.3.5 Presence in the Action Area

Although the Action Area is part of the historical range and is listed as potentially occurring in all Action Area counties (TPWD, 2013), presently no habitat for the lesser prairie-chicken occurs within 70+ miles (see Figure 5 in Appendix A; SGPCHAT, 2011); therefore, this species is not expected to occur within the Action Area.

2.4 BLACK-FOOTED FERRET

2.4.1 Reasons for Status

The black-footed ferret (*Mustela nigripes*) was federally listed as endangered on March 11, 1967 (32 Fed. Reg. 4001), without critical habitat. The main factors for the decline of the black-footed ferret are linked to the rapid decline and fragmentation of the prairie dog. The black-footed ferret feed primarily on prairie dogs with mice, moths, and potentially birds supplementing their diet.

2.4.2 Habitat

The black-footed ferret is associated primarily with prairie dogs (*Cynomys* spp.) and prairie dog towns.

2.4.3 Range

Historically, the species ranged throughout the Great Plains where they occurred in semi-arid grasslands and mountain basins in Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, and Wyoming (Campbell, 2003).

2.4.4 Distribution in Texas

In Texas, black-footed ferrets originally ranged throughout the northeastern third of the state, including the Panhandle, Trans-Pecos, and most of the Rolling Plains (Schmidly, 2004). The last Texas records of the species were from Bailey County (1963) (Schmidly, 2004) and are believed to extirpated from Texas.

2.4.5 Presence in the Action Area

Most authorities consider the black-footed ferret extirpated from Texas, and therefore, it is highly unlikely that the species is present in the Action Area.

2.5 GRAY WOLF

2.5.1 Reasons for Status

The gray wolf (*Canis lupus*) was federally listed as endangered on March 11, 1967 (32 Fed. Reg. 4001). The main factor for the decline of the gray wolf is predator control by humans to protect domestic livestock and wild ungulates (TPWD, 2012).

2.5.2 Habitat

The gray wolf inhabits forests, brushlands, or grasslands, and prefers open country with suitable cover and denning sites (Schmidly, 2004).

2.5.3 Range

Historically, the species ranged throughout North America, except in the southeast where they were replaced by the red wolf, and south through much of Mexico.

2.5.4 Distribution in Texas

The gray wolf historically inhabited the western two-thirds of Texas, but have been extirpated (Schmidly, 2004), with the last authenticated reports being recorded in Texas in December 1970.

2.5.5 Presence in the Action Area

Most authorities consider the gray wolf extirpated from Texas, and therefore, it is highly unlikely that the species is present in the Action Area.

2.6 ARKANSAS RIVER SHINER

2.6.1 Reasons for Status

The Arkansas River shiner (*Notropis girardi*) was federally listed as threatened on November 23, 1998 (63 Fed. Reg. 64771 64799), with critical habitat (66 Fed. Reg. 18001 18034, April 4, 2001). Numerous factors have lead to the decline of the Arkansas River shiner, including habitat loss and destruction, drought, reduced stream flow due to groundwater pumping and diversion, construction of impoundments, and competition.

2.6.2 Habitat

Historically, the species inhabited the main channels of wide, shallow, sand-bottomed rivers and larger streams of the Arkansas River basin (Gilbert, 1980). Currently, the fish is typically found in turbid waters of broad shallow channels of main streams, over mostly silt and shifting sand bottom, and is extremely dependent upon flood flows from June through August for successful spawning.

2.6.3 Range

Historically, the species occurred throughout the Arkansas River main stem and in that river's major right bank tributary basin in Kansas, New Mexico, Oklahoma, and Texas. Losing over 80 percent of its historical habitat, it is now restricted its former range to along the Canadian River in Oklahoma, Texas, and New Mexico, and a small population still exists in the Cimarron River in Oklahoma and Kansas (FWS, 2013).

2.6.4 Distribution in Texas

In Texas, the species is associated with the Canadian River which crosses the Panhandle through the following counties: Hutchinson, Hemphill, Oldham, Potter, and Roberts.

2.6.5 Presence in the Action Area

The Arkansas River shiner is not expected to occur within the Action Area and no effects to the shiner are anticipated.

3.0 ANALYSIS OF EFFECTS

To assess the potential impacts of the proposed Project on federally endangered and threatened species, Aktins personnel (1) compiled county lists of threatened and endangered species from FWS and TPWD (Table 1), (2) conducted a literature review and searched for other scientific data to determine species distributions, habitat needs, and other biological requirements, and (3) conducted a field evaluation of the natural resources within the Action Area that could serve as potential habitat (e.g., wetlands or vegetation communities) for federally listed species.

On February 1, 2012, and March 23–27, 2013, Atkins performed a habitat evaluation across the Action Area. Atkins used public roadways and access to Valero properties to evaluate vegetation communities and other potential wildlife habitats in the Action Area. Survey methods involved both windshield and pedestrian surveys of the Action Area. Within the Action Area, public roadways were traversed to evaluate vegetation communities. Representative vegetation cover, species, and photographs were recorded at approximately 32 observation locations in and around the Action Area. Observations from the field evaluation were combined with recent aerial imagery to develop a general vegetation community or habitat map of the Action Area using a Geographical Information System (i.e., ArcGIS).

3.1 EFFECT DETERMINATIONS

Based on field evaluations and spatial analysis, vegetation, habitats and land uses within the Action Area (Appendix A, Figure 3) include about 64% of land that is currently dedicated cropland (mostly circle-crop pivot irrigation), <2% are industrial areas and cities (includes but not limited to towns, quarries, refineries, plants, and cattle feed lot operations), and 34% is rangeland (small portion of improved pastures and mostly unimproved rangeland dotted with oil and gas well pads and operational windfarms). Rangeland areas consisted of 40–80% herbaceous cover with little bluestem, curly mesquite (*Hilaria belangeri*), blue gramma (*Bouteloua gracilis*), sand sagebrush (*Artemisia filifolia*), tumbleweed (*Salsola tragus*), sandhill amaranth (*Amaranthus arencola*), and broomweed making up the dominant vegetation. Representative photos of these areas are presented in Appendix B.

Based on the literature and file reviews pertaining to federally listed species potentially occurring in the county, the field survey and habitat evaluation, and the consideration of potential direct, indirect, and cumulative effects that may result from the Crude Expansion Project, it was determined that the project would likely result in no effects to federally listed species. The following explains the rationale for no effect determinations.

3.2 LEAST TERN

The least tern (interior subspecies) is a potential migrant through the Action Area and is known to nest in the region; potential nesting locations for interior least terns occur about 22 miles south on the Canadian River and Lake Meredith (TPWD, 2013). These areas of potential habitat are beyond the Action Area; the Crude Expansion Project is likely to have no effect on interior least terns or their potential habitats.

3.3 WHOOPING CRANE

The whooping crane is also a potential migrant through the Action Area. The whooping crane would only migrate through the region, as their final wintering destination is the Texas Coast. Numerous large ponds, surrounded by agricultural fields, could serve as potential stopover habitat during migration; however, the Action Area is approximately 140 miles west of the whooping crane migration corridor (FWS, 2011a; Appendix A, Figure 4). The migration corridor is defined as the area where 95% of whooping crane sightings have occurred from 1975–2010 (FWS, 2009). Occasionally, whooping cranes stray beyond the typical migration corridor. In 1977, a whooping crane was sighted 22 miles south of the Action Area on the southwest end of Lake Meredith-Canadian River (see Figure 4). Thus, it is possible that whooping cranes would occur in a transient manner during migration within the Action Area. Although numerous potential stopover locations exist within the Action Area, the Crude Expansion Project is likely to have no effect on these ponds or wetlands.

Mortality via collisions with structures (e.g., wind turbines or power lines) is a primary concern during migration. The Crude Expansion Project would add new stack structures to the existing facility. Generally, FWS requires avoidance and minimization measures on certain structural projects (e.g., wind turbines or power lines) that occur within the migration corridor (see Figure 4; FWS, 2009). New external structures will be located within existing facilities, immediately adjacent to existing structures, and stack heights less than the height of other existing refinery stack structures; the Crude Expansion Project would not increase whooping crane collision risk. Based on the potential direct, indirect, and cumulative effects associated with the Crude Expansion Project, no effects to whooping cranes are likely to result. Since the Crude Expansion Project does not occur within the migration corridor (where 95% of whooping crane sighting have occurred), and would not involve new stack structures of substantial height that would increase collision risk, the Crude Expansion Project is likely to have no effect on whooping cranes.

3.4 LESSER PRAIRIE-CHICKEN

Portions of the Action Area were once part of the historical range of the lesser prairie-chicken, but now only occur in two disjunct populations in the Panhandle (Lockwood and Freeman, 2004). The population on the western edge of the Panhandle extends from Deaf Smith County southward to Gaines and possibly Andrews counties, while the eastern population ranges from Lipscomb County south to Collingsworth County (Lockwood and Freeman, 2004). Although the Action Area is part of the historical range, presently no habitat for the lesser prairie-chicken occurs within 70+ miles (Appendix A, Figure 5; SGPCHAT, 2011); therefore, this species is not expected to occur within the Action Area. The important habitat components include a combination of oaks and sagebrush, which were absent from the Action Area. No previously recorded occurrences of lesser prairie-chickens exist for Action Area (TPWD, 2013). The Crude Expansion Project would likely have no effect on lesser prairie-chickens.

3.5 BLACK-FOOTED FERRET AND GREY WOLF

Both the black-footed ferret and the gray wolf are considered extirpated from the state. The Crude Expansion Project would likely have no effect on the black-footed ferret and the gray wolf.

3.6 ARKANSAS RIVER SHINER

The Crude Expansion Project is not anticipated to have any effect on aquatic habitats; additionally, the Arkansas River shiver is not expected to occur within the Action Area. The Crude Expansion Project would likely have no effect on the Arkansas River shiver.

4.0 SUMMARY

Valero has requested an authorization to modify existing and build new equipment at the Valero McKee Refinery, which will allow for an increase in the overall processing volume of crude oil, herein referred to as the Crude Expansion Project. Valero's Crude Expansion Project's permitting process includes the EPA's review of the project's potential GHG pollutants. As a Federal permitting authority, when issuing a permit, the EPA must also consider a project's effects on federally listed species, as per Section 7 of the ESA (FWS and NMFS, 1998). To facilitate Section 7 of the ESA, this BA has been prepared for, and submitted to, the EPA for determination of the Crude Expansion Project's effects on federally listed species.

Several PSD Applicants have employed SIL modeling results to determine the extent of the Action Area during GHG review with EPA. For the Valero Refinery Expansion Project, 23.4 miles is the maximum distance for which a NAAQS SIL is exceeded. Since this BA is centered on GHG emission effects, non-GHG pollutants, and the direct effects of construction and operation, an Action Area extending 23.4 miles outward from the refinery center point to the west-southwest was chosen for the federally listed species effect evaluation (see Figure 2).

Five species are federally listed as endangered or threatened and potentially occur within Dallam, Sherman, Hartley, and Moore counties, including the whooping crane, interior least tern, gray wolf, black-footed ferret, and Arkansas River shiner (see Table 1; interior least tern and Arkansas River shiner are only listed as potentially occurring within Moore County). A sixth species, the lesser prairie-chicken, is a candidate for listing under the ESA and is included in the analysis despite not actually being designated as federally endangered or threatened at present. It should be noted that the current politics and science surrounding the lesser prairie-chicken indicates that it could be listed in the near future due to continuously precipitous population declines (see 76 Fed. Reg. 66393). Since there exists a possibility of the lesser prairie-chicken becoming a federally listed species during the Crude Expansion Project's GHG permitting process, it is included within this BA.

In addition to performing literature and file reviews on federally listed species that potentially occur within the Action Area, Atkins performed a habitat evaluation on February 1, 2012, and March 23–27, 2013. Atkins used public roadways and access to Valero properties to evaluate vegetation communities and other potential wildlife habitats in the Action Area. Vegetation, habitats and land uses within the Action Area (see Figure 3) include about 64% of land that is currently dedicated cropland (mostly circle-crop pivot irrigation), <2% are industrial areas and cities (includes but not limited to towns, quarries, refineries, plants, and cattle feed lot operations), and 34% is rangeland (small portion of improved pastures and mostly unimproved rangeland dotted with oil and gas well pads and operational windfarms). Rangeland areas consisted of 40–80% herbaceous cover with little bluestem, curly mesquite, blue gramma, sand sagebrush, tumbleweed, sandhill amaranth, and broomweed making up the dominant vegetation. Representative photos of these areas are presented in Appendix B.

Whooping cranes could be present in the Action Area, but only in a transient manner during migration. The Action Area is located 140 miles west of the whooping crane migration corridor. New external structures will be located within existing facilities, immediately adjacent to existing structures, and stack heights would be below the height of other existing refinery stack structures; the Crude Expansion Project would not increase whooping crane collision risk. Regarding the interior least tern, breeding or foraging habitat occurs in the Action Area 22 miles to the south and would not be affected by the Crude Expansion Project. The lesser prairie-chicken is not known to occur within 70+ miles (see Figure 5), nor was habitat observed in the Action Area. No effect would likely result to the Arkansas River shiner since the Crude Expansion Project is not anticipated to have any effect on aquatic habitats; additionally, the Arkansas River shiner is not expected to occur within the Action Area. Last, both the gray wolf and black-footed ferret are considered extirpated within the state. Based on the literature and file reviews pertaining to federally listed species potentially occurring in the Action Area, the field survey and habitat evaluation, and the consideration of potential direct, indirect, and cumulative effects that may result from the Crude Expansion Project, it was determined that the project would likely result in no effects to federally listed species.

5.0 REFERENCES

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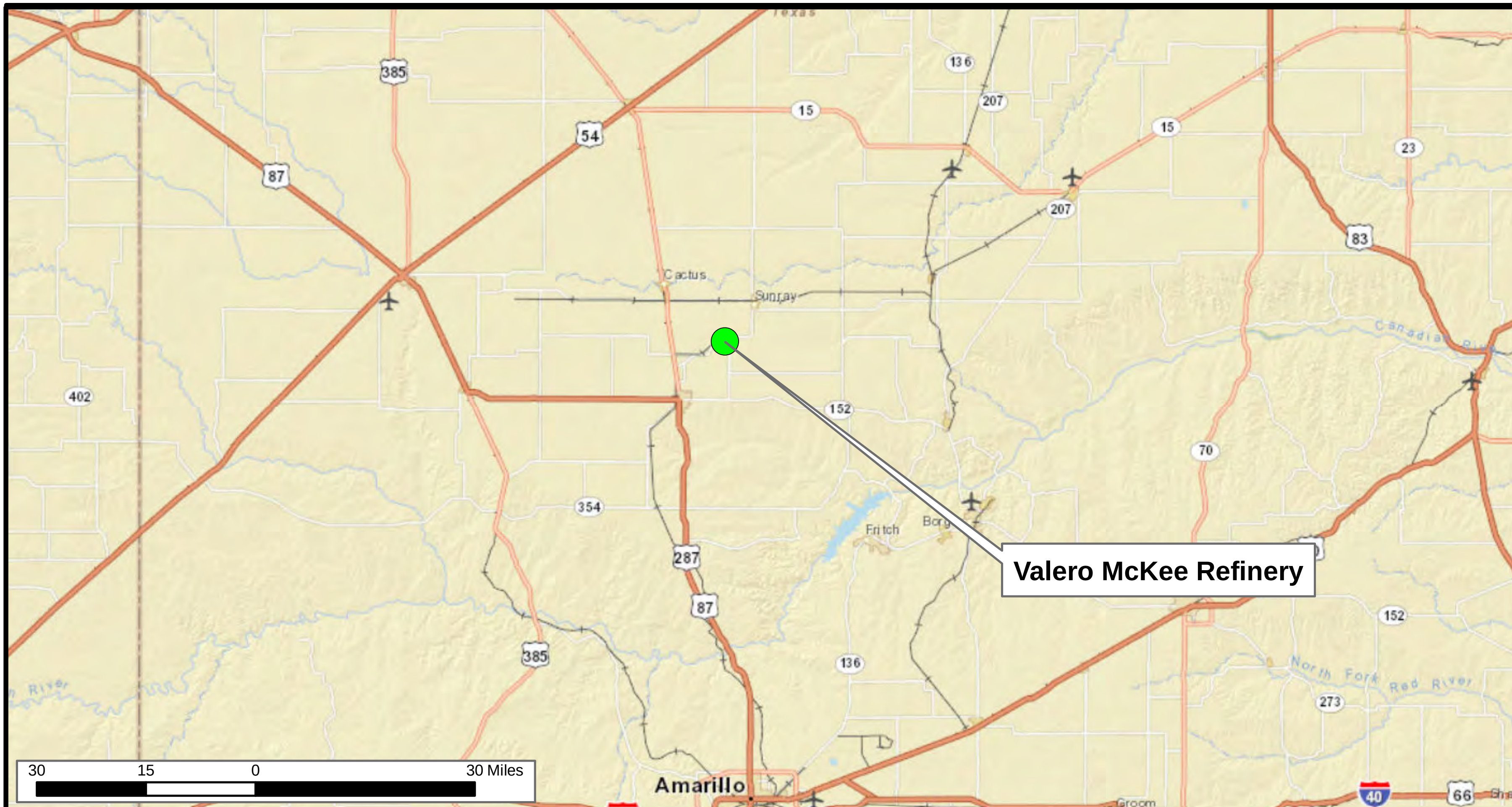
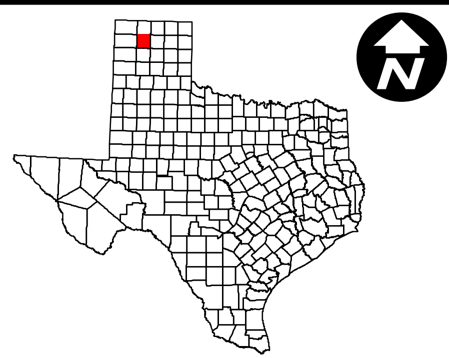
Appendix A

Figures





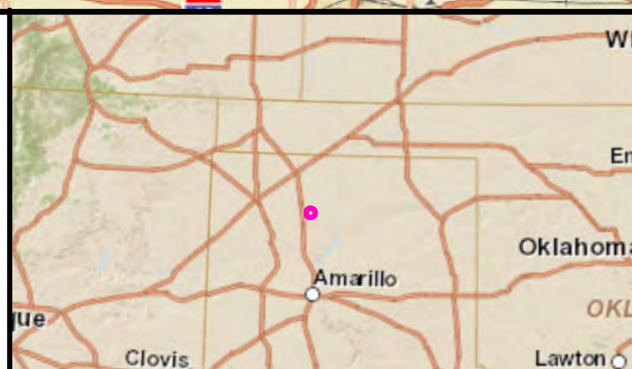


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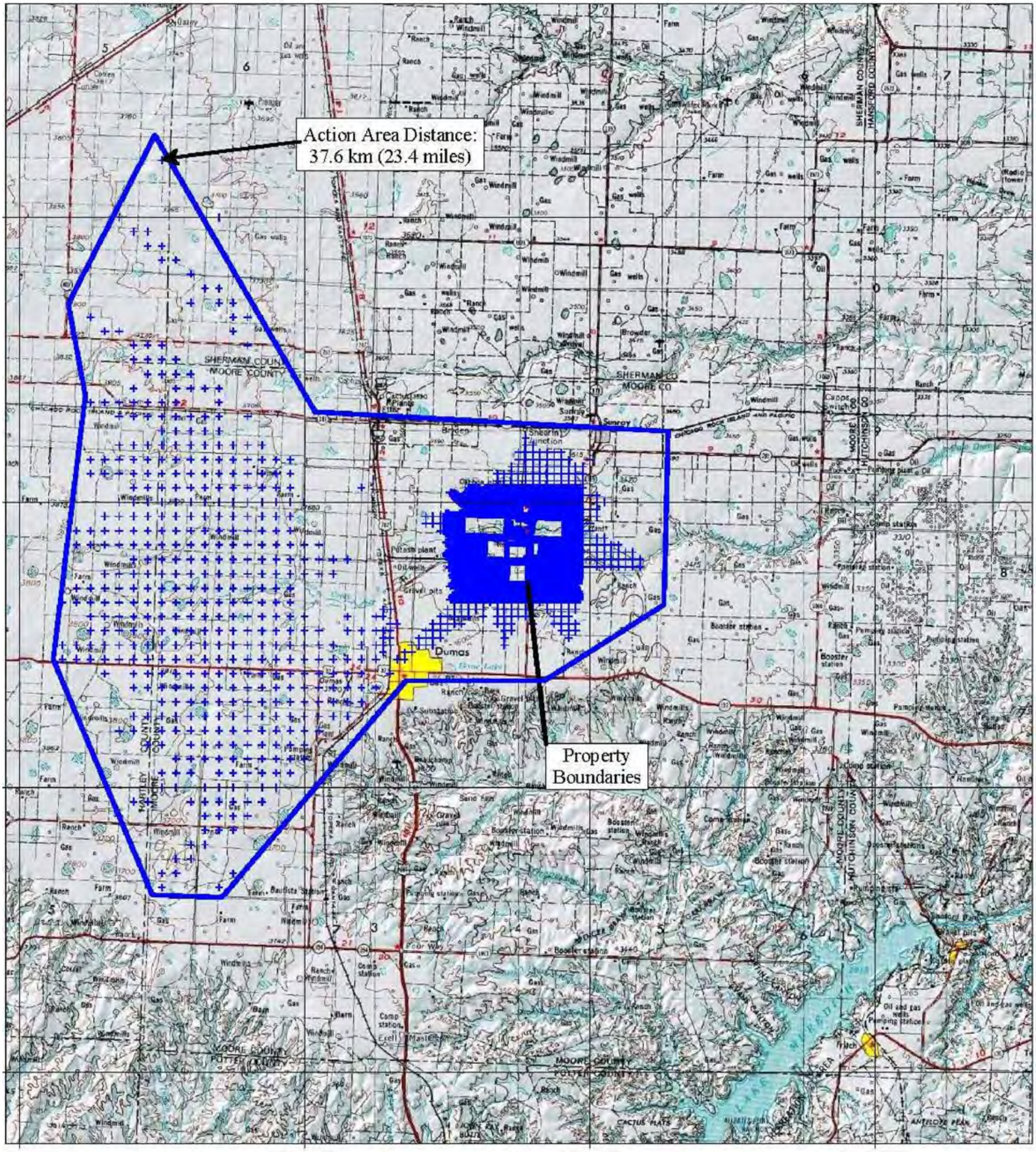
Figure 1: Vicinity Map
Crude Expansion Project
Valero McKee Refinery
Moore County, Texas



+ Receptor (exceeding SIL)

Action Area

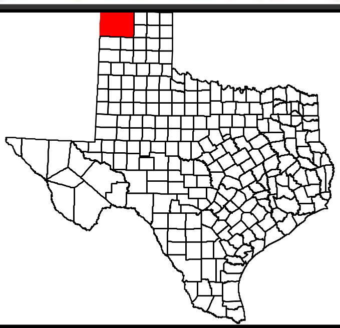


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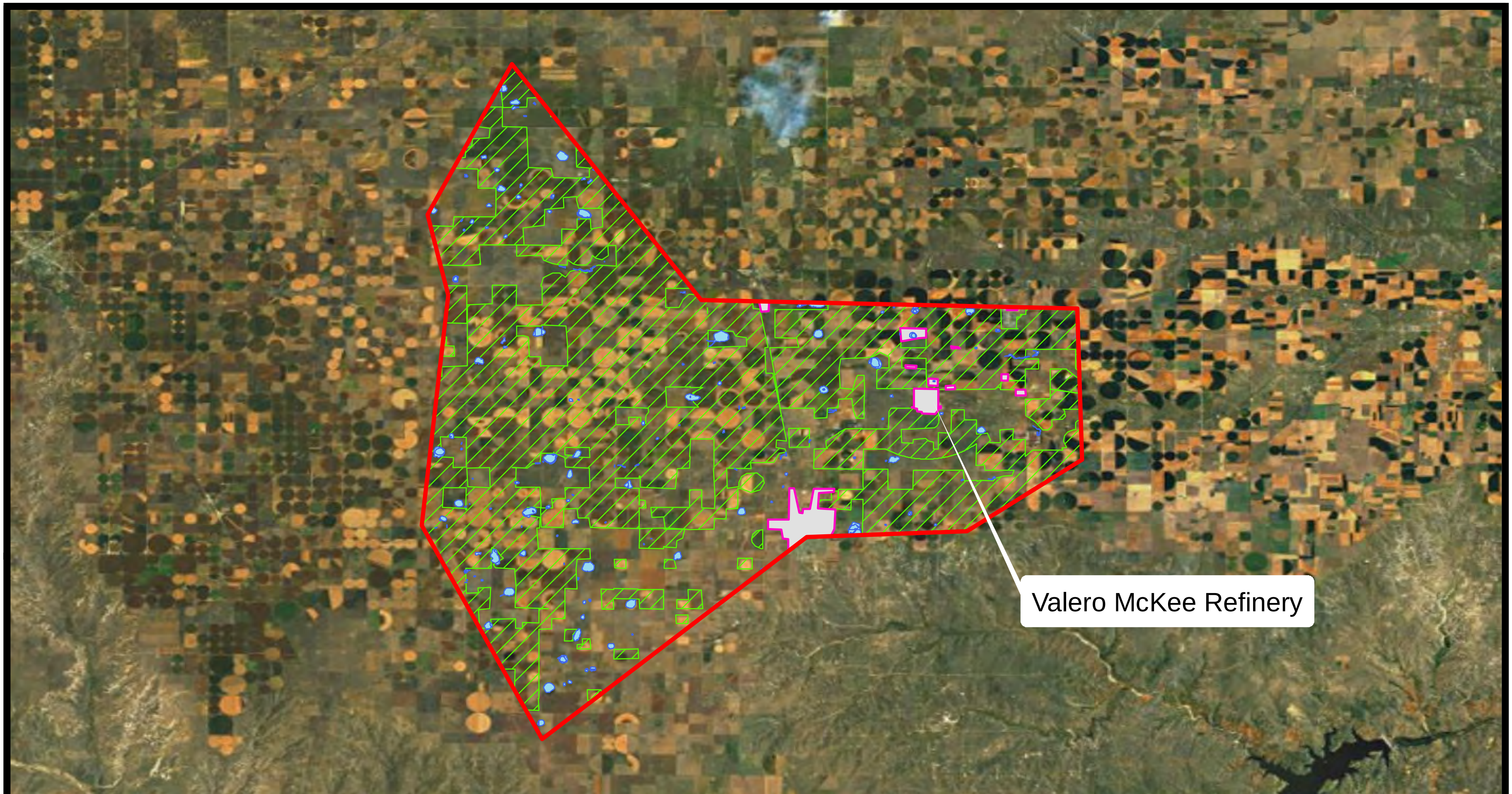
Figure 2: BA Action Area Based on Dispersion Modeling Crude Expansion Project Valero McKee Refinery Dallam, Sherman, Hartley, and Moore counties, Texas



Action Area

Wetland or Pond

Industrial Site

Cropland

Improved Pasture and Rangeland

0 2 4 8

Miles

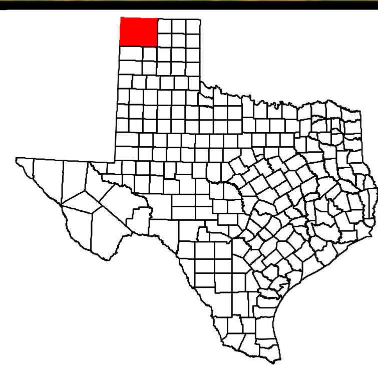


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Figure 3
Vegetation, Habitats, and Landuse
Crude Expansion Project
Valero McKee Refinery
Dallam, Sherman,
Hartley and Moore counties, Texas

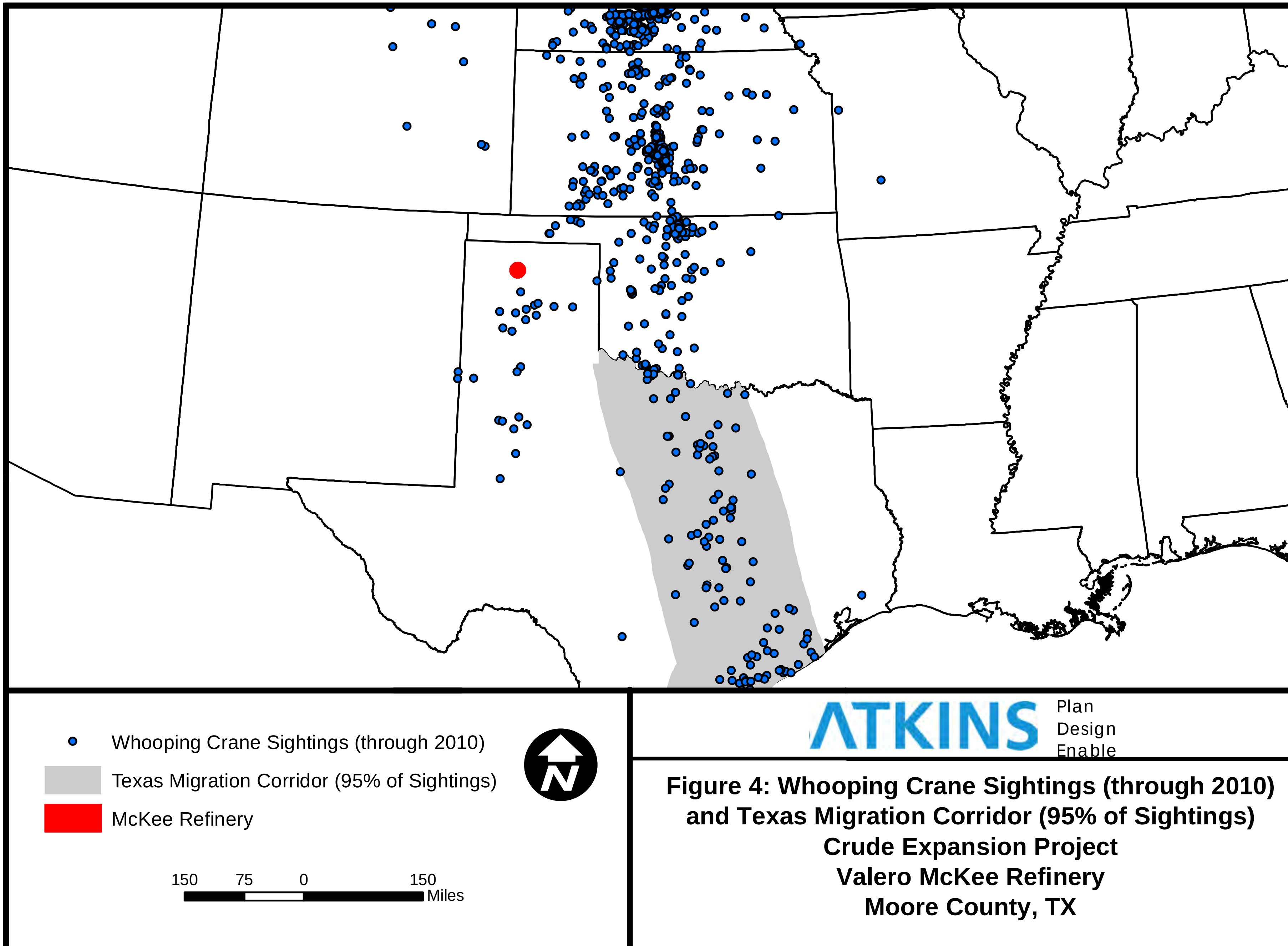

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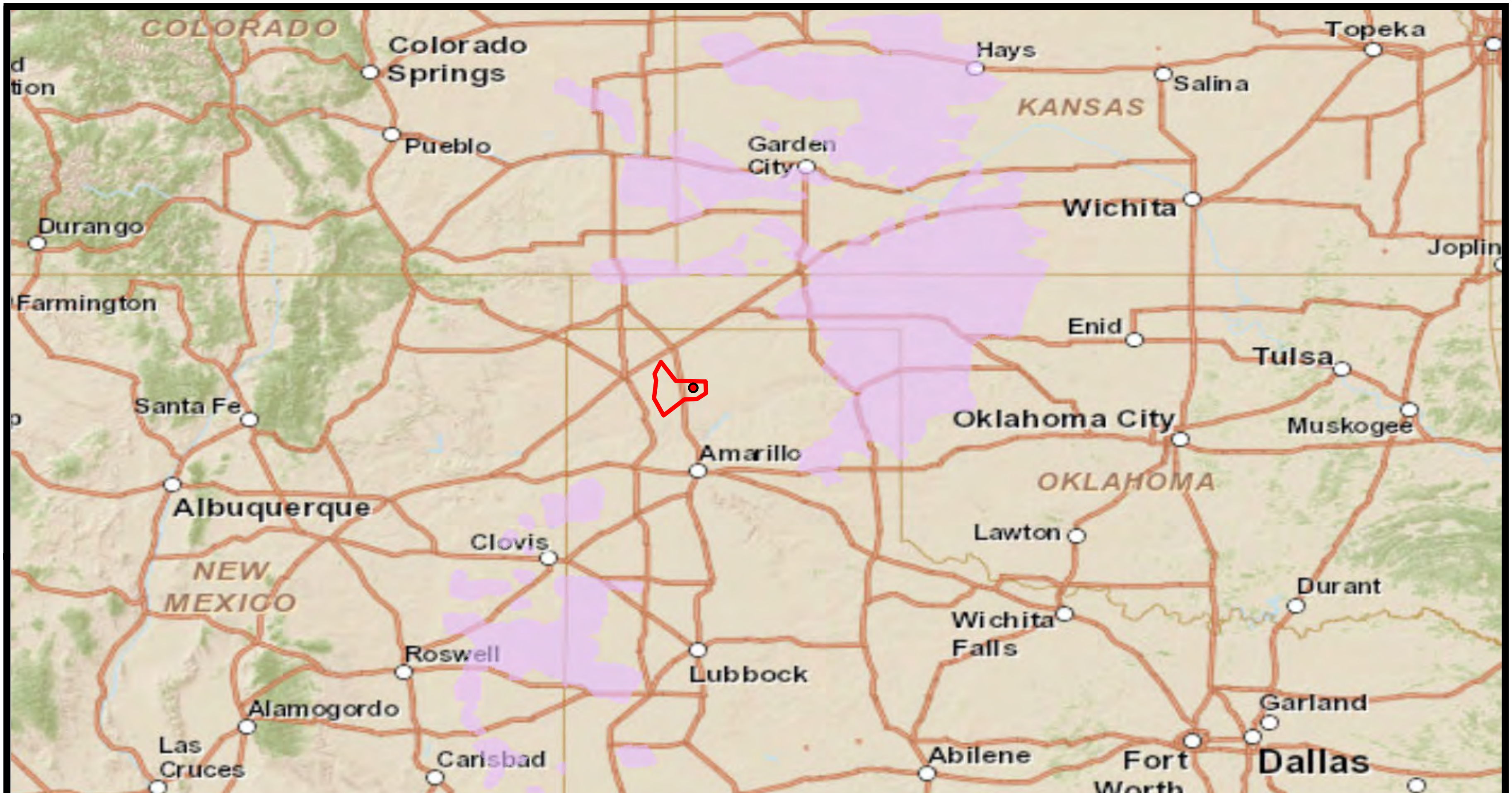
Figure 4: Whooping Crane Sightings (through 2010) and Texas Migration Corridor (95% of Sightings)
Crude Expansion Project
Valero McKee Refinery
Moore County, TX



McKee Refinery

Action Area

LEPC Habitat

100 50 0 100 Miles

Source: SGPCHAT (2011)

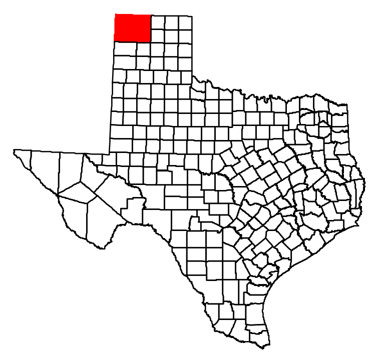


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Figure 5
Lesser Prairie Chicken (LEPC)
Habitat Map
Crude Expansion Project
Valero McKee Refinery
Dallam, Sherman,
Hartley, and Moore counties, Texas

Appendix B

Representative Photographs

Representative Site Photographs. Above, facing north, this image displays typical improved rangeland in the Action Area; wind farms are also sporadic throughout the Action Area. McKee Refinery is in the background and is an example of industrial areas displayed on Figure 3. Below, facing north, this image displays typical agricultural cropland in the Action Area.

Representative Site Photographs. Above, in the foreground is South Palo Duro Creek, an ephemeral stream that is immediately adjacent to the project area. Below, this image displays typical ground cover found on rangelands within the Action Area. In rangelands and agricultural fields in the Action Area, total ground cover was low and sporadic.

Representative Site Photographs. Above, this image displays typical unimproved rangeland in the Action Area; these areas were mostly associated with topographical breaks. Below, this image displays typical circle crop pivot irrigation systems that comprised a large portion of the Action Area.

Representative Site Photographs. Above, this image a cattle feed lot operation; these areas were classified as industrial areas on Figure 3. Below, within the unimproved rangeland in the southern portions of the Action Area, oil and gas operations were common.

Appendix C

List of Preparers

Valero McKee Refinery Crude Expansion Project

Biological Assessment

List of Preparers:

Staff	Title	Years Experience
Thomas P. Dixon	Senior Ecologist	9
Gary Newgord	Avian Ecologist	7
Alex Amponsah	Environmental Planner	8
Michael Horvath	Senior Project Manager	25